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Partial versus total knee replacement for knee osteoarthritis



Triangulation of findings from several different study designs is important in the generation of the best broadly applicable and generalisable evidence to guide the delivery of efficacious and cost-effective health-care interventions. David Beard and colleagues¹ report in *The Lancet* an impressive randomised controlled trial that compared the outcomes of partial knee replacement (PKR) and total knee replacement (TKR) for treatment of isolated medial compartment osteoarthritis of the knee in 528 patients (42% female, mean age 65.0 years) who had an American Society of Anesthesiologists score of 1 or 2, an intact anterior cruciate ligament, and correctable varus deformity. In the TOPKAT study,² Beard and colleagues employed a useful expertise-based and equipoise-based delivery unit design, which successfully facilitated recruitment after previous studies reported difficulty.

Before this study, data from large longitudinal datasets, such as registries, have reported a much higher cumulative probability of revision after PKR than after TKR, uncertainty regarding differences in patient-related outcomes between groups, and much lower early postoperative mortality with PKR.³⁻⁹ However, these studies have been subject to selection bias, and little was known of the relative cost-effectiveness of the two operations. A randomised controlled trial is thus timely and important. TOPKAT² shows that both interventions provide a 5-year benefit for patients regarding Oxford Knee Score; no evidence of any difference was found between the groups (mean difference 1.04, 95% CI -0.42 to 2.50; $p=0.159$), indicating that both interventions were clinically effective.

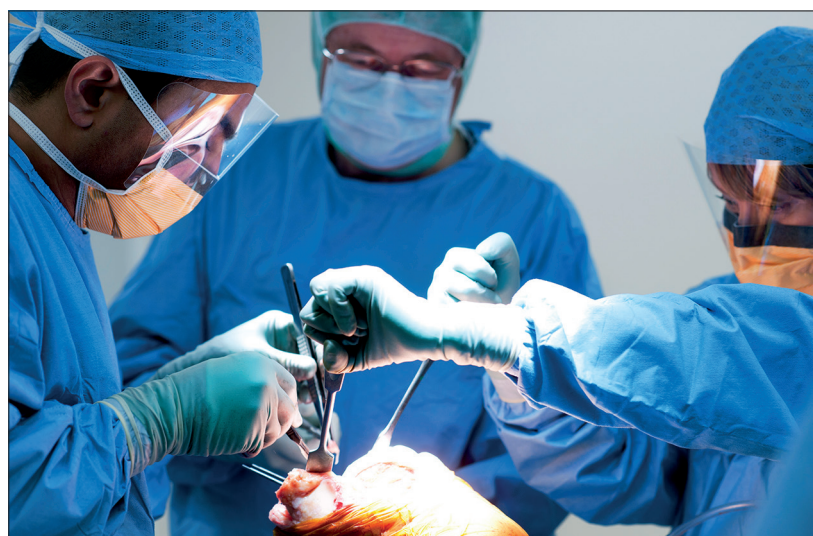
The trial was not powered to show the magnitude of difference in number of revisions that has previously been suggested by registries.² The widely generalisable data obtained from the National Joint Registry for England, Wales, Northern Ireland, and the Isle of Man, which were recorded in the same location as this study, report 5-year revision rates of 2.65% (95% CI 2.61-2.68) for TKR and 6.11% (5.94-6.29) for PKR.¹⁰ However, TOPKAT was only powered to detect a difference of more than 7% (which would equate to almost a 300% increase in the number of revisions between the two groups).

The health economics data are a welcome addition to our knowledge base, and they suggest improved

cost-effectiveness with PKR. In TOPKAT's within-trial cost-effectiveness analysis, PKR was found to be more effective (0.240 additional quality-adjusted life-years, 95% CI 0.046 to 0.434) and less expensive (-£910, -1503 to -317) than TKR during the 5 years of follow-up. Whether this trend will be sustained beyond 5 years remains to be seen. As more implants are revised over time, the relative cost-effectiveness could change; thus, we await the long-term results with interest. Beard and colleagues report the difference in cost-effectiveness as being partly due to increased outpatient attendance in the TKR group; however, the reasons for this increased attendance are not reported. Follow-up protocols are an area of interest and debate at present, particularly whether we should be reviewing postoperative arthroplasty patients as frequently as at present, and this trial further highlights the potential cost implications associated with this follow-up.

It is encouraging to see that the trial compared classes of knee replacement, rather than brands, and it is thus more likely to be generalisable. Surgeons undertaking PKR in the study had to be relatively high-volume surgeons (performing more than ten surgeries per annum compared to the national median of five surgeries per annum, with an upper quartile of more than 13 surgeries per annum), which means that the results might not be fully generalisable but instead show what is attainable if surgery is undertaken by sub-specialists.^{2,10} We note that the same strict requirement

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for surgical experience far greater than the national median was not a requirement in the TKR group, and that the most frequently used brand of TKR, the LCS, is no longer available.

This valuable study adds strength to previous data, which suggested no difference in clinical outcomes between PKR and TKR.⁴ Although it is underpowered to show the marked differences in number of revisions or mortality shown by larger cohort studies, it adds important new evidence for the evaluation of the relative cost-effectiveness of these different operations in the first 5 years after surgery. In view of the results of the TOPKAT study, we agree that the potential benefits and drawbacks associated with PKR versus TKR should be discussed as part of the informed consent process with patients meeting the inclusion criteria for this trial. Further studies that use methods such as discrete choice experiments and qualitative methods to explore the lived experience of patients undergoing PKR and TKR could help patients and surgeons in the difficult choice between PKR and TKR in those patients who are suitable to receive either option. In the meantime, Beard and colleagues should be commended for the successful delivery of an important randomised controlled trial in arthroplasty, an area that has previously been notorious for the lack of such evidence and for the challenges of conducting randomised trials.

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